OPERATING INSTRUCTIONS
AND SPARE PARTS LISTS

MUBEA – PUNCH
MODEL KL OPTIMA

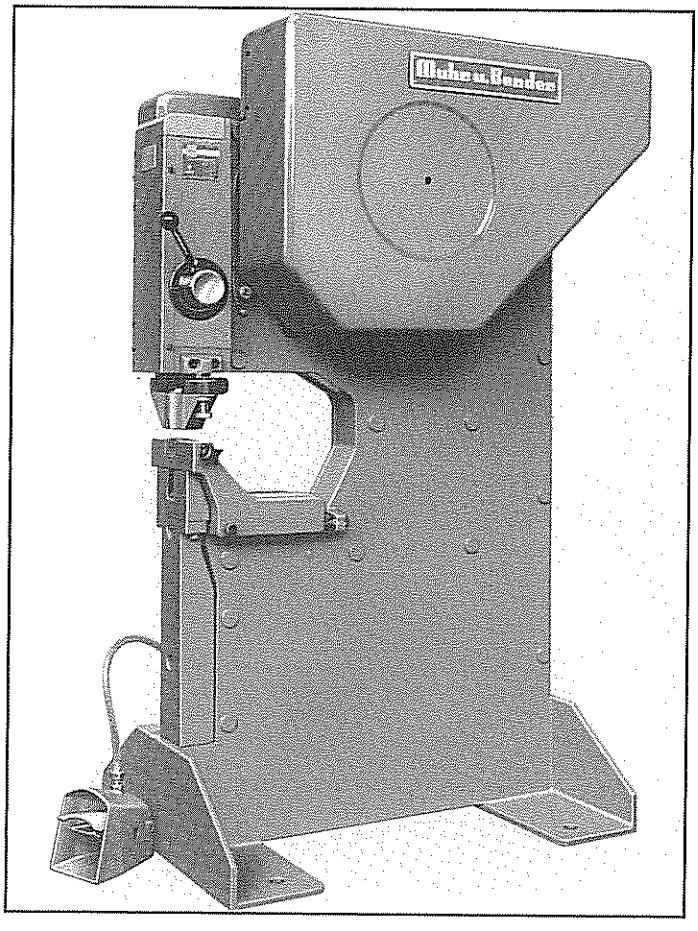
Size:
Serial No.:
Motor type:
Motor rating:
Operating voltage:

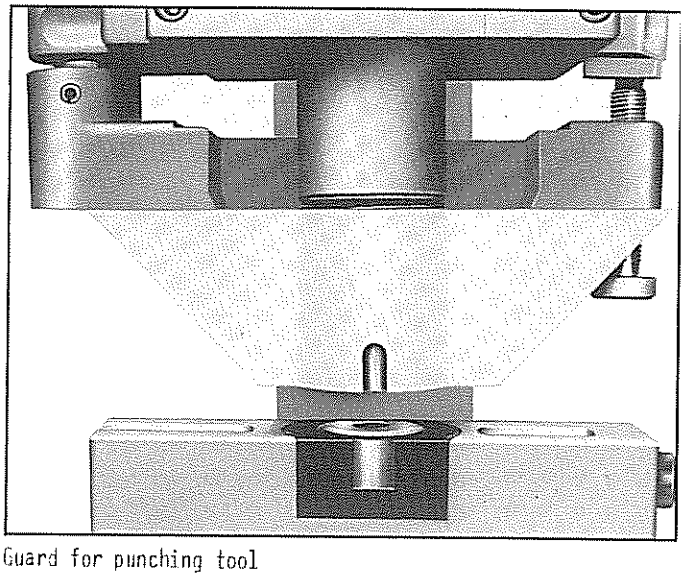
OPERATING INSTRUCTIONS

SPARE PARTS LIST

Various pictures and descriptions symbolize the operation of the machines type KL and KBL.

Muhr und Bender Attendorn
D-5952 Attendorn · Telephone: (0 27 22) 62-1 · Cables: Muhr Attendorn · Telex: 08 76 706/07 muhr d





Guard for punching tool

You have made a good choice, as you will soon see for yourself. The experience of decades and the latest know-how in the field of punch and shear construction are incorporated in the Original MUBEA Machine. As numerous satisfied customers have varified time and time again, it is just the daily routine handling of this machine that makes its advantages particularly apparent.

In order to be able to fully utilize the machine, it is urgently recommended that you read and follow these operating instructions carefully.

Experience shows that the machine has an unusually long service life. Components which are subject to normal wear and tear can be replaced at any time. It is important that you then ask for Original MUBEA spare parts exclusively. Only then can the service life of the machine and uniform quality of the result of its work be attained. This is also true if you wish to extend the range of application of your machine by adding further tools.

Shop practice will very soon show you that MUBEA machines can effectively be complimented and are thus universally useable, at the same time, economical in operation.

To give you a general picture of the components used in the construction machine and how these interact, we refer you to the list with the designations and numbers of the components. The same part numbers are also frequently quoted in the text with reference to that list.

If you should have any questions or problems of any kind, please get into touch with us: Our service staff is always at your service. Upon request you can conclude a maintenance agreement at a favourable price.

And another thing: Give your MUBEA Machine the care it deserves. You will find many pointers on this throughout this manual.

Your MUBEA Machine corresponds to the regulations for the prevention of accidents and to the machine protection law.

For safety of operation, the punching tool is provided with a guard.

The figures of the punch and the various tools in these operating instructions do not show this guard as otherwise the functional representation would be affected.

Transportation

When transporting the machine by truck, stabilize by bolting to sturdy planks and secure to prevent tilting sidewise.

The weight of your machine is stated in the attached brochure.

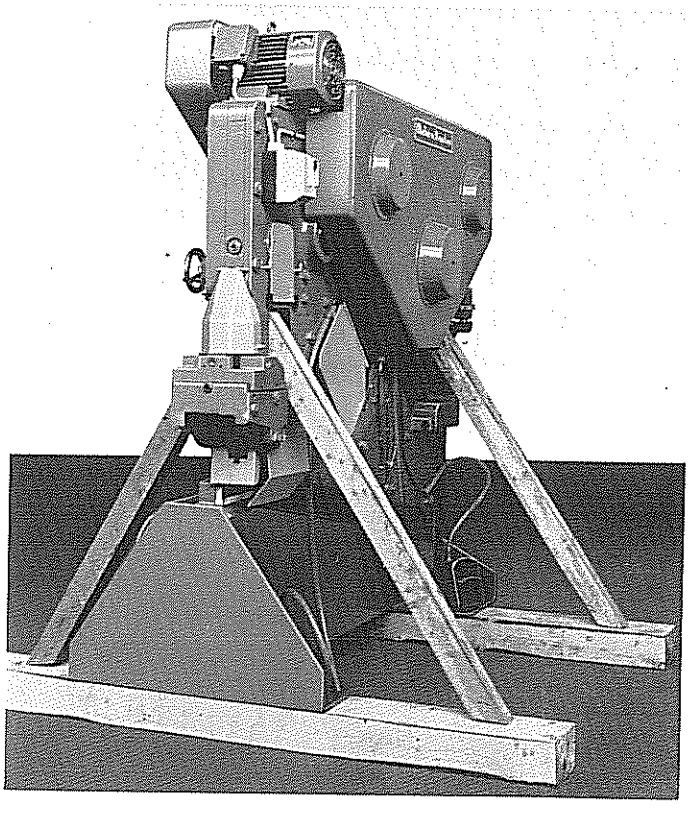


Fig. 1: Transporting the machine by truck

When handling the machine by crane, insert the hook in the eye-bolt provided for that purpose.

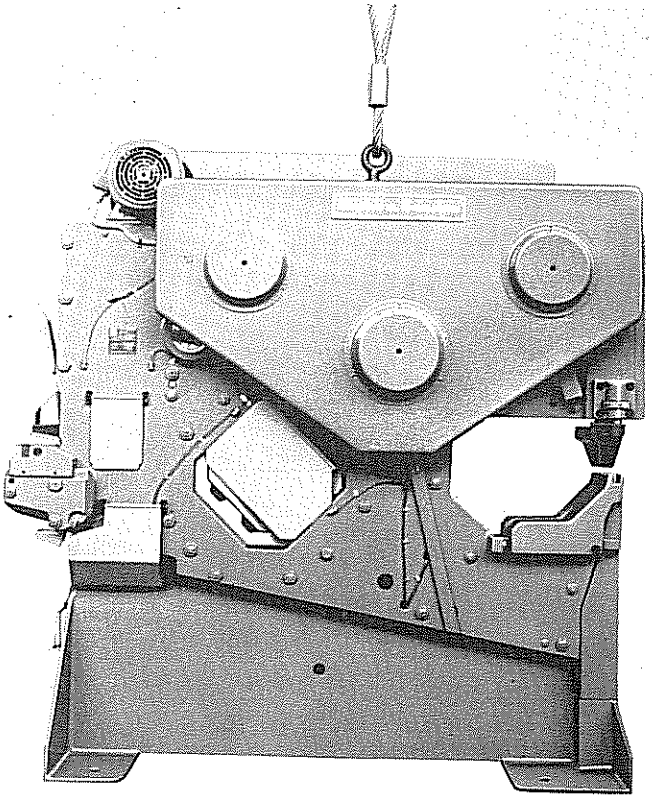


Fig. 2: Transporting the machine by crane

Erection

The working positions of the machine are at normal working level. Adjustment of level by platform or foundation basis is therefore unnecessary.

All the necessary data for providing a foundation level with the ground for stationary installation are given in the attached foundation plan. Tighten the foundation bolts securely after the grouting-in compound has set. Dowel plugs may be used instead of foundation bolts.

Check whether the machine is properly vertical.

If the machine is employed in a mobile capacity, please make sure that the surface on which it stands is level and also make sure that the wheels are locked during cutting operations.

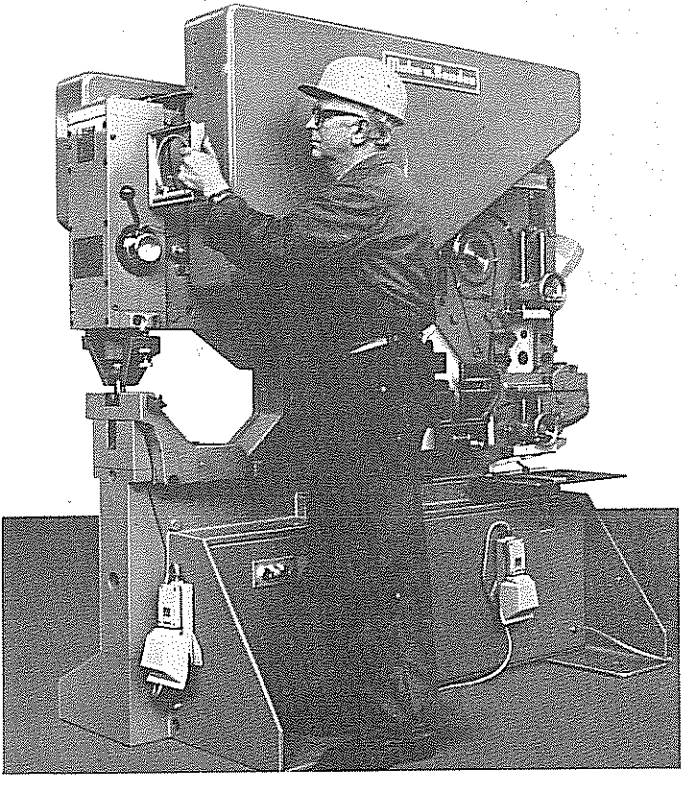


Fig. 3: Checking for suitable erection and footing

cable should be routed through the passage in the base of the machine. Connection has to be carried out by an electrical expert as per the enclosed wiring diagram (check uniformity of tension).

Switch on the motor briefly: If the flywheel does not rotate in the direction of the arrow, stop the motor and change over any 2 of the phase wires.

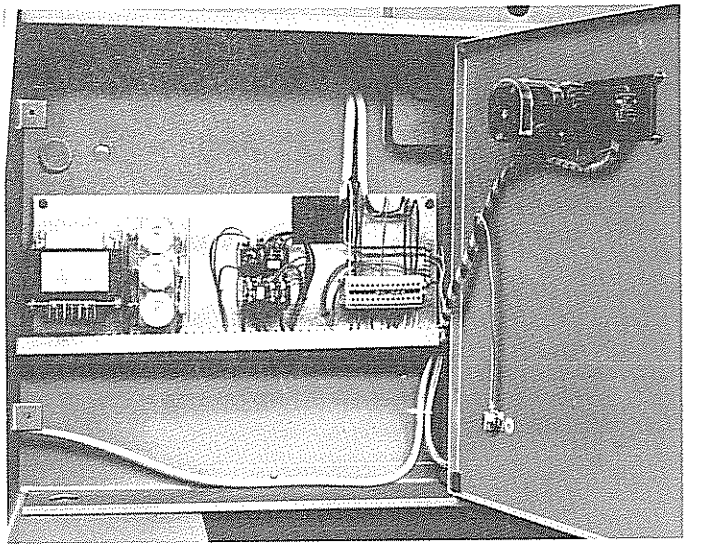


Fig. 4: Connection of the power supply

Connection and Operation

The machine is shipped ready for installation. The terminal strip to which the feeder line should be routed is located in the base of the machine. The steel base is provided with a hole to pass the wiring through when the machine is to be used in a stationary capacity. If the location of the machine changes, the connecting

Prior to commissioning the machine, check whether the slides move properly and the tools are properly seated and set. For this purpose the circuit closer and breaker has to be actuated briefly at pedal switch closed in order to release the engagements. For moving the slide, rotate the

flywheel in the direction of the arrow.

Lubricate the machine thorougly (see lubrication chart).

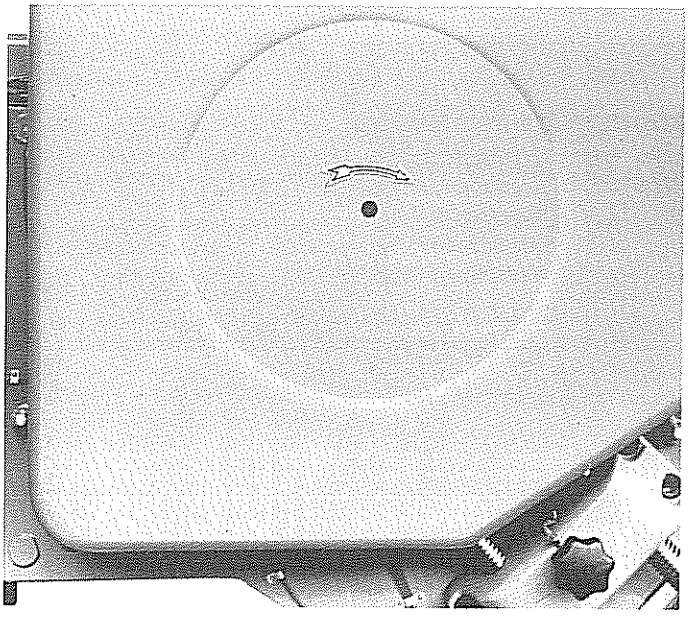


Fig. 5: Make sure flywheel rotates in proper direction

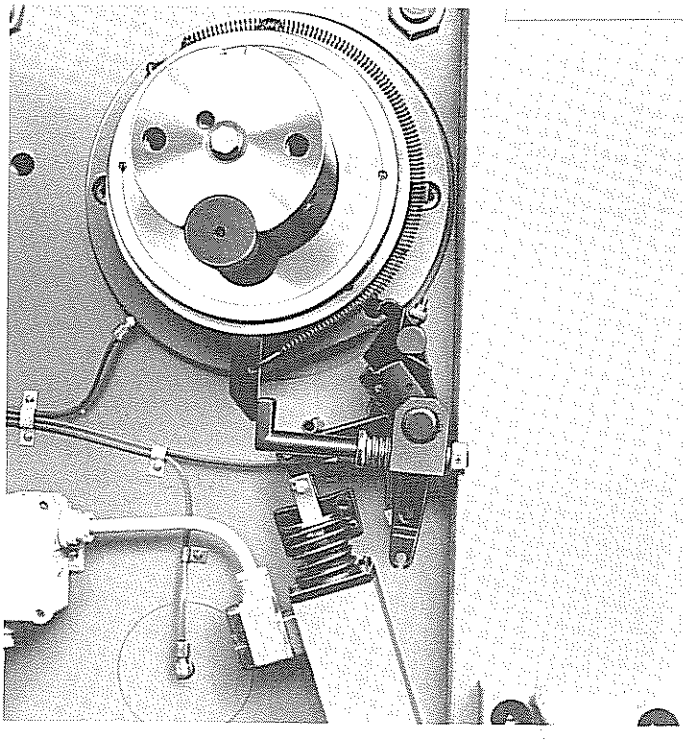


Fig. 6: Rolling key in disengaged position

Clutch and Engagement

1 Clutch

On all MUBEA machines each working slide has its own drive and hence also its own clutch and engagement. The MUBEA clutch is a robust and absolutely dependable rolling key type.

1a) Position of Rolling Key

When the clutch is disengaged the eccentric shaft is stationary in the top dead center position of the slide, while the coupling wheel rotates on its shaft journal.

When the engagement mechanism is actuated, the rolling trip arm stop no. A 378 (plate shear), A 426 (section shear), A 461 (punch), is swung away and the rolling key lever no. A 166, A 201 or A 241 is released. The rolling key no. 165, 200, 240 is pulled into the engaged position by means of the tension spring no. 164, 199, 239, thus positively connecting the eccentric shaft no. A 145, A 180, A 220 with the drive gear no. 154, 189, 229 via the coupling sleeves 155, 190, 230. The rotating drive gear now forces the eccentric shaft to follow the rotation and thus moves the slide.

After one complete revolution of the eccentric shaft the rolling key is disengaged again and the eccentric shaft remains in the top dead center position - the drive gear continues to run freely.

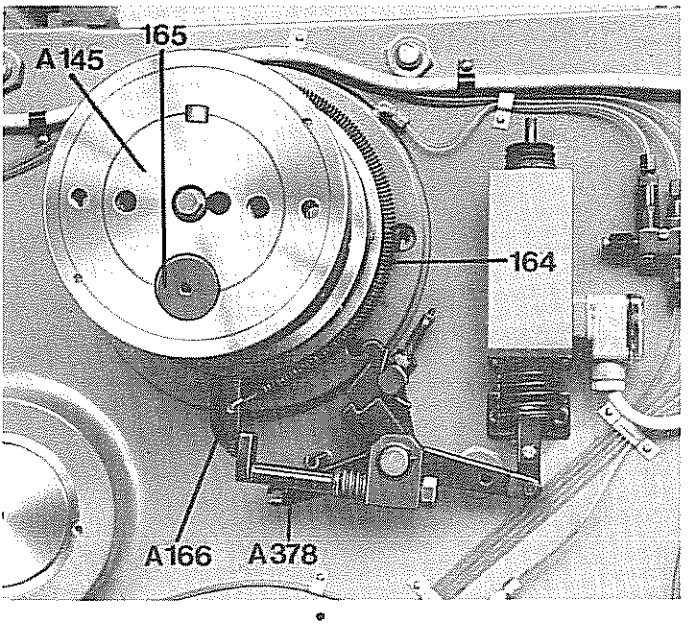


Fig. 7: Rolling key in disengaged position

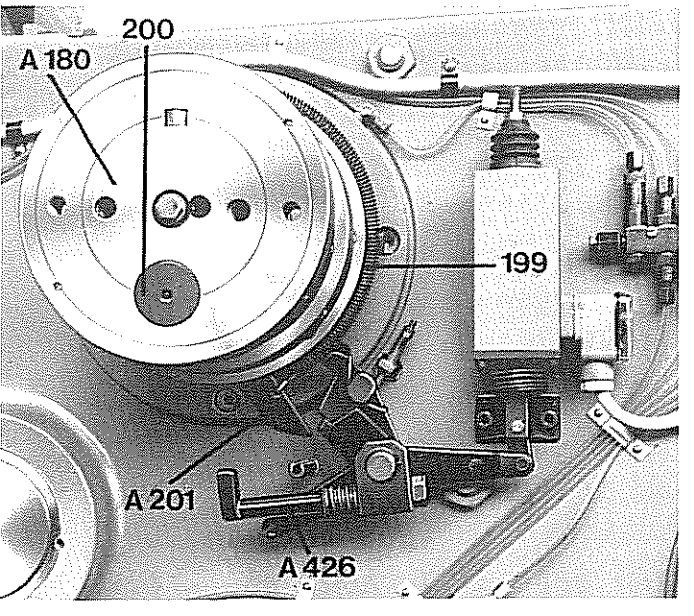


Fig. 8: Rolling key in engaged position

1b) Clicking of the Rolling Key
If clicking of the rolling key is observed after a lengthy period of operation, adjust the eccentric brake 248 (plate shear and punch), 260 (section shear) by tightening the cylindrical screw 256, 268, and check the slide guides.

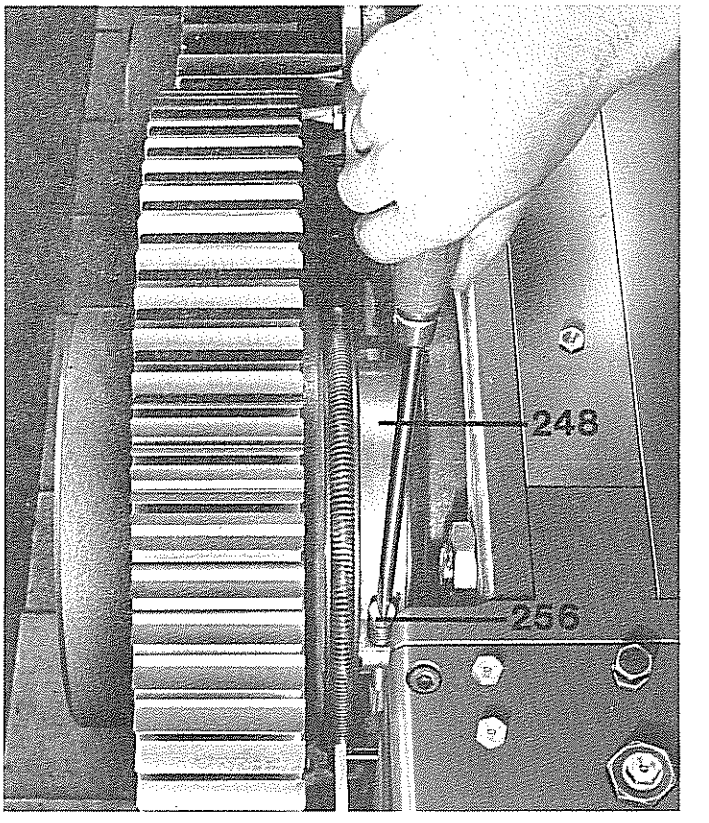


Fig. 9: Adjusting the eccentric brake

1c) Clutch under Load
If the machine stops during cutting for any reason (power failure, blown fuse), switch off the motor at once. If there is material in the cutting tool, the machine is under high compression stresses. To relieve these, rotate the flywheel in reverse. This

relieves the load on the rolling key, which may then be swung out. The eccentric must be rotated backwards.

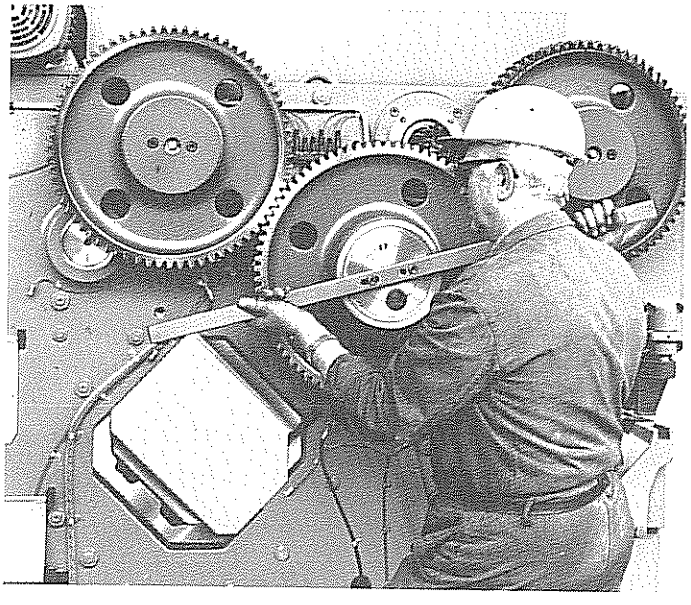


Fig. 10: Rotate eccentric backwards

If stoppage of the machine is due to overloading (excessively large stock cross section of tensile strength too high), check whether the machine is still running properly. Stop the machine, engage the various slides and turn by hand (see section "Commissioning").

1d) Single Stroke or Repeat Safety Device

This safety device operates absolutely safely and complies with the accident prevention regulations. This applies for foot, solenoid and pneumatic engagement. This safety device prevents a working stroke from being repeated, even if the engaging lever is held in the engaged position.

If the machine is to work with continuous stroke, the single stroke safety device must be put out of action by removing the disengaging pin A 175, A 210 and A 247b (see fig. 12).

If single stroke device is removed the machine can be engaged optionally for single stroke and continuous stroke.

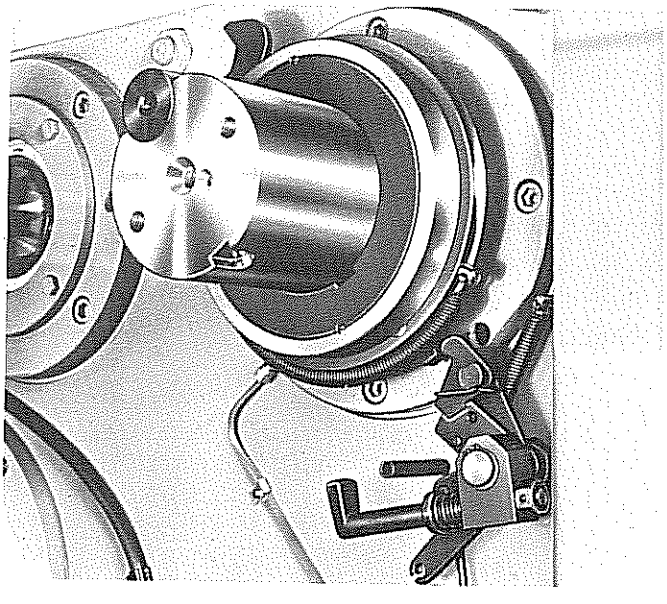


Fig. 11: Single stroke safety device

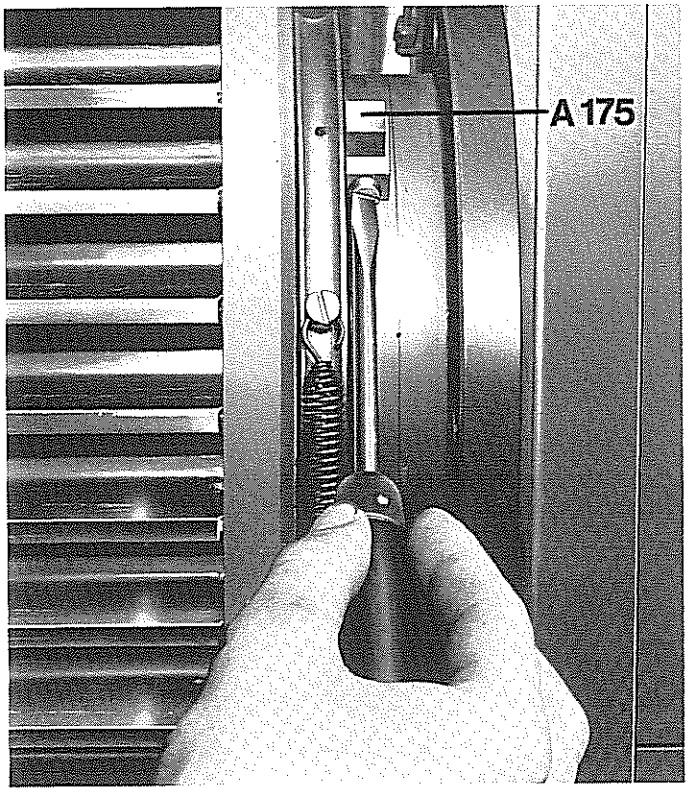


Fig. 12: Removal of the disengaging pin

1e) Foot Engagement

Each clutch is equipped with foot engagement. This enables the operator to hold the material with both hands. In addition, depending on the length of the cable used, he can also actuate the engagement anywhere around the machine.

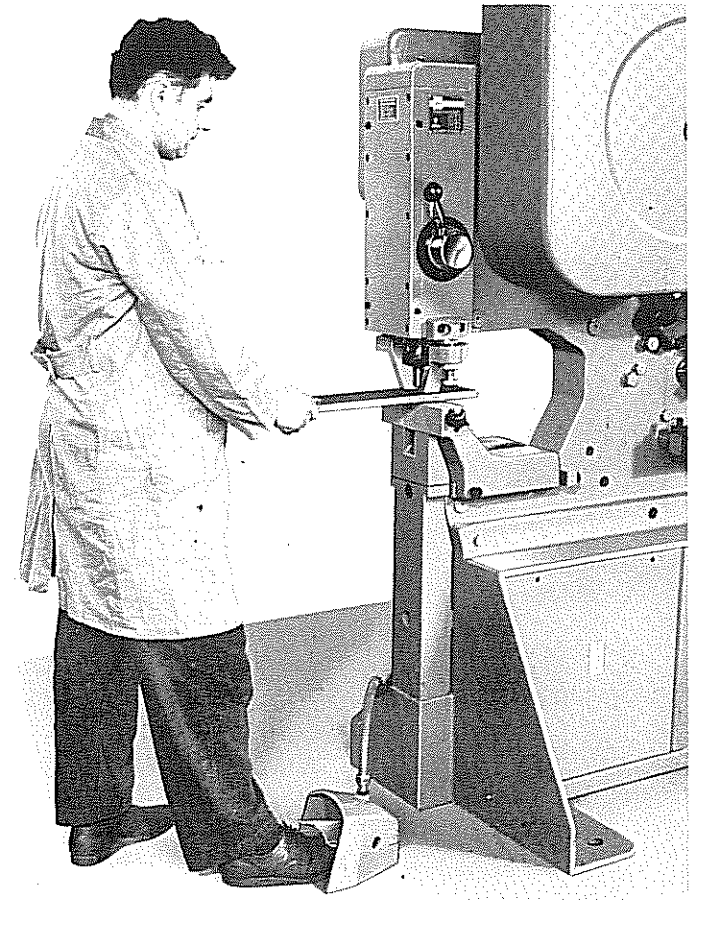


Fig. 13: Foot engagement

1f) Solenoid Engagement / Pneumatic Engagement

Each clutch may also be actuated by means pneumatic engagement. Pneumatic engagements are suitable when work is to be carried out with pneumatically controlled coordinate tables, index rail, etc. Stops with contact switches can be eguipped additionally at solenoid and pneumatic engagement. The rolling key stop is connected with the solenoid or the pneumatic cylinder via a linkage. Actuation is carried out by foot switches which should be pressed until the slide starts to move. The foot switch is connected to the machine by a cable and can therefore be located where it is convenient for the operator.

The solenoid or pneumatic clutch engagement mechanism may also be annexed at any time, and this is best done by one of our erectors.

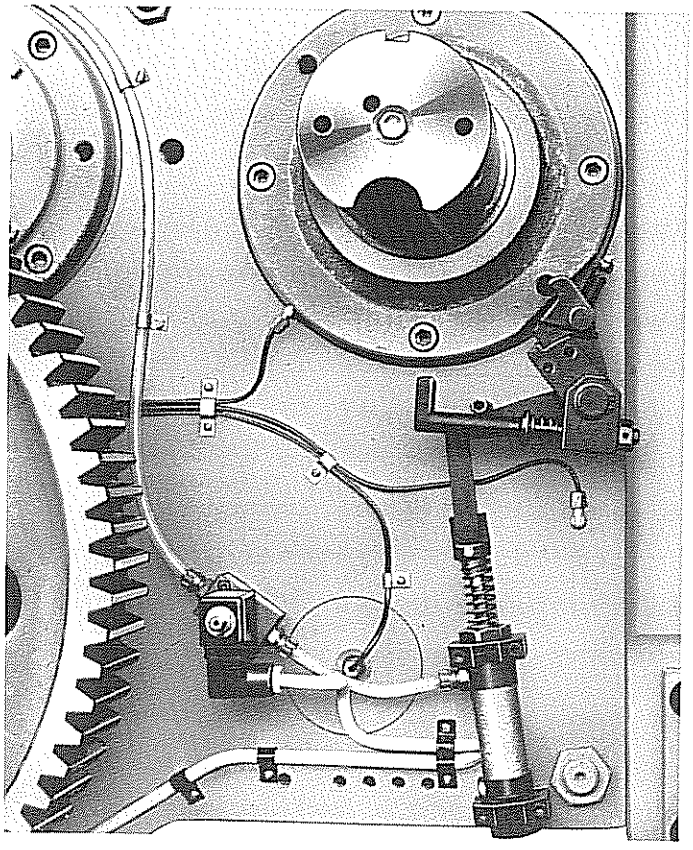


Fig. 14: Pneumatic engagement

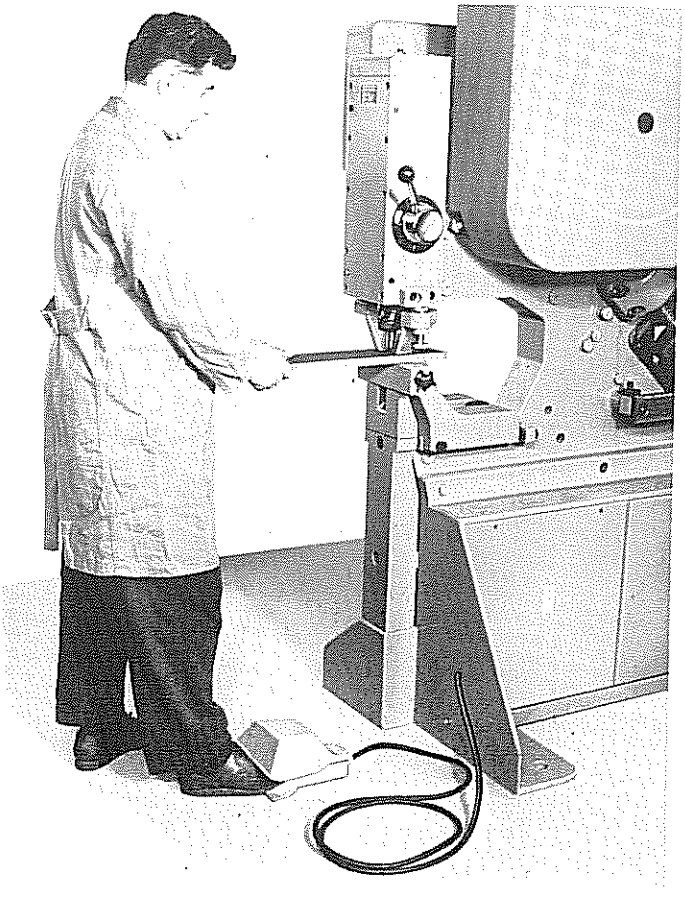


Fig. 15: Electrical foot engagement

Lubrication of the Machine

a) Lubricants

The machine should be exclusively lubricated with oil; the same oil may be employed for all lubrication points.

The following brands of oil may be used:

Maker: DEUTSCHE SHELL
Brand: Tonna Oel 72, viscosity 13E at 50° C

Maker: MOBIL OIL A.G.
Brand: VACTRA OIL no. 4, viscosity 12, 8E at 50° C

Maker: ESSO AG.
Brand: Millcott K-70, viscosity 14, 5E at 50° C

Maker: BP A.G.
Brand: ENERGOL HP 60-C, viscosity 12E at 50° C

Maker: BV - ARAL
Brand: BS 114, viscosity 15E at 50° C

Maker: RHEINPREUSSEN
Brand: RHP - KH 150, viscosity 15E at 50° C

b) Manual Lubrication

The oil is applied by means of the lubricating hand gun in the tool set. Follow the lubrication chart attached and make sure that the prescribed quantities of oil are injected regularly.

After certain intervals the grease on the gear wheels has become used up. This can be detected by more noise from the gear wheels. When this occurs, grease the gear wheels with suitable grease (Sinit III ARAL).

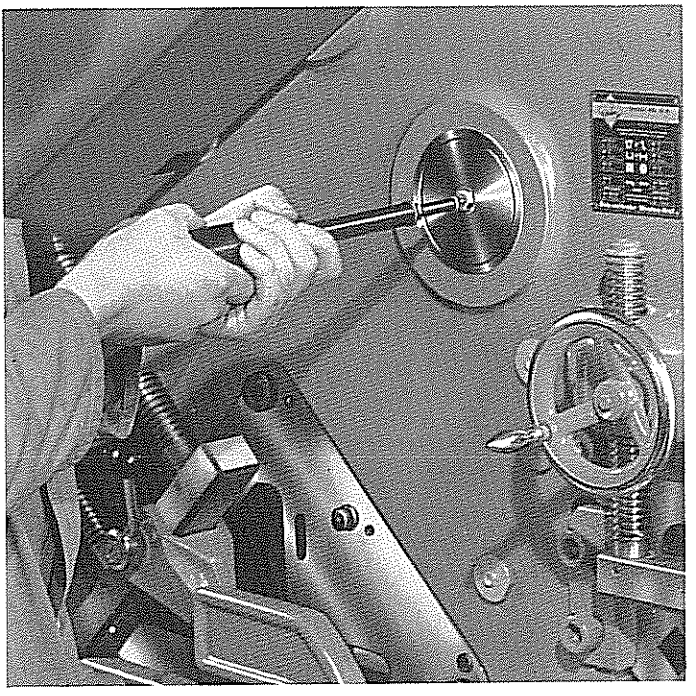


Fig. 16: Lubricating with the hand gun

c) Centralized Lubrication

The same oil may be used for centralized lubrication as for manual lubrication. Lubrication is carried out merely by means of the hand lubrication pump fitted to the machine. Please follow the lubrication instructions on the plate next to the lubrication pump.

Actuating of the hand lubrication pump occurs by smooth pulling through of the pump lever up to the stop.

In order to enable perfect functioning of the measuring valves, there has to make an interruption of 2 minutes between the various greasing processes. You will find detailed instructions on the maintenance of the lubrication system in the maintenance instructions by the Tecalemit company enclosed with this manual.

At each greasing process there has to be pumped so long until there is noted a palpable resistance.

Fig. 17: Centralized lubrication

T H E P U N C H

1. General

The MUBEA punch is of a particularly advantageous design, exceeding by far the range of applications of an ordinary punch in that it can do many jobs that formerly could be performed on punch presses only.

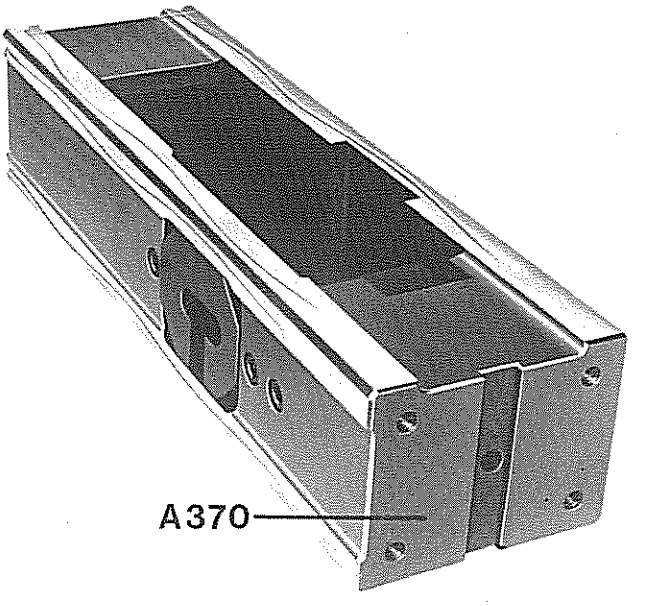


Fig. 83: Punch slide

The extremely long punch slide A 370has a large and almost square clamping surface. It is hence easy to fit big and deep-throated tools, as the slide, thanks to its length, is well suited to absorbing tilting forces.

Even very complicated stampings and punching operations are precisely carried out with the various special tools such as multiple die, follow-up dies, etc. manufactured and supplied by the MUBEA tooling division.

2. Adjustment of the Slide Guide

Adjustment of the slide guide is necessary if punch slide A 370 has no good guidance. The slide guide is properly adjusted when the punch plunges easily into the die when engaging the spotter lever 590. The readjustment of the slide is carried out by shifting the conical gib lock plug.

Adjustment is carried out as follows:

First release the gib block plugs 360 by turning anti-clockwise. With a screw driver introduced through the gib block plugs 360 the wedges 336 and 338 can be adjusted by rotating the head screws 358 in an anti-clockwise direction.

The wedges are properly adjusted when the punch slide A 370 can be moved upwards and downwards easily with the spotter lever 590. After adjustment has been carried out, retighten the gib block plugs 360.

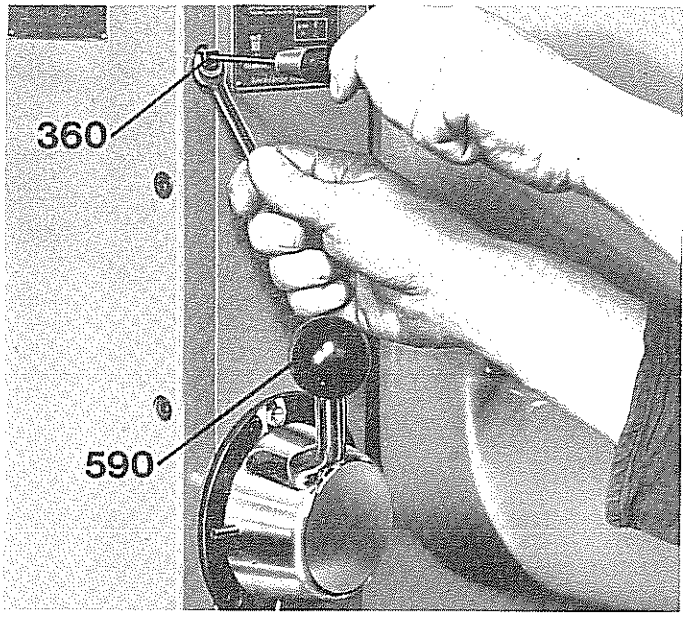


Fig. 85: Adjusting the slide guide, front-side

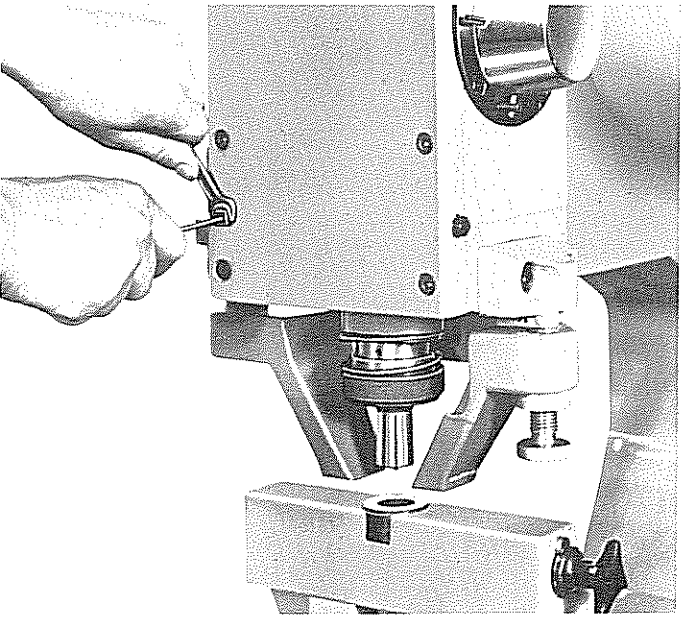


Fig. 84: Adjusting the slide guide, laterally

3. Saddle and Saddle Support

MUBEA punches are so designed that the punch saddle A 720 is supported by a special saddle support A 731/A 733. This offers the advantage that the saddle can neither give way nor tilt and the punching pressure is introduced vertically into the frame of the machine.

The saddle support remains in place during all punching operations and merely has to be removed when punching the flanges of all

channels and I-beams within the capacity of the machine. The saddle support is removed by merely releasing the retaining bolts A734.

This arrangement is particularly useful when large and deep-throated tools are mounted on the punch, because these can be effectively used with a maximum of support and protection.

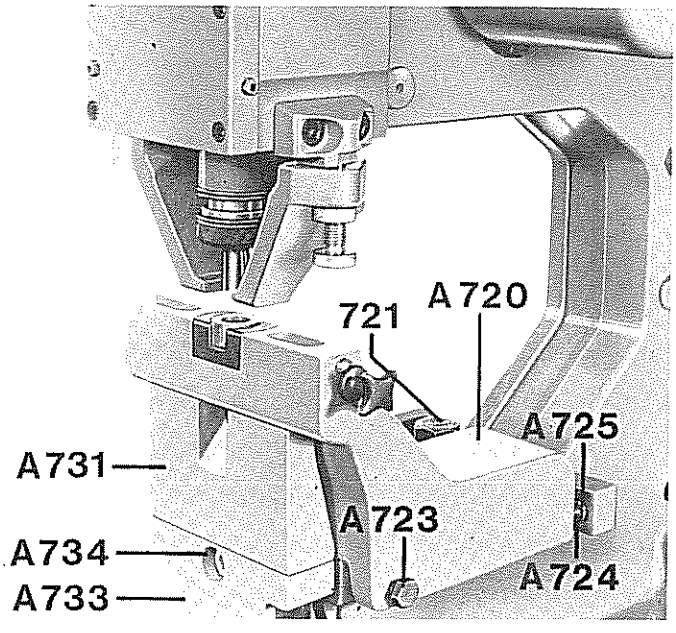


Fig. 86: Saddle with saddle support

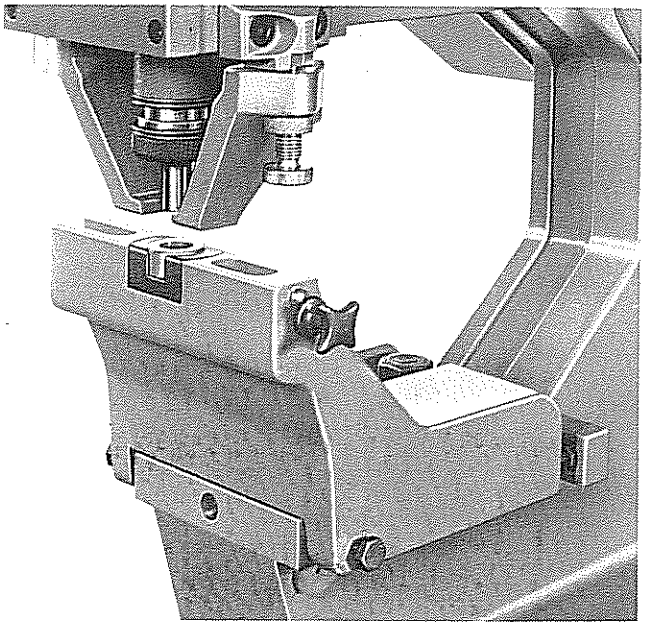


Fig. 87: Saddle without saddle support

4. MUBEA Standardized Punches and Dies

MUBEA punches and dies are available in 4 standard sizes and fit all machines.

Size I	up to 15 mm Ø
Size II	from 15 Ø to 30 Ø
Size III	from 30 Ø to 40 Ø
Size IV	from 40 Ø to 50 Ø

Using standard equipment, punches and dies up to size II can be fitted on machine sizes 45-20 to 80-40 and KL 45 to 80, while punches and dies up to size III can be fitted to machines of the sizes 100-50 and 130-70 and KL 100 and 130.

For punches and dies beyond this standardized range, see item 11 special tools.

For punching holes in the flanges of channels or beams we supply flange dies with a surface inclination corresponding to the slope of the section flange.

For punching holes in small angles, tees, channels or I-beams near the web with the help of a shifting gauge, eccentric dies are required having an off-center hole near the end of the die. When fitting eccentric dies, slide the punch saddle backwards until the punch and die hole are again co-axial.

Eccentric dies are needed for sizes 45-20 to 80-40 and KL 45 to 80 when angles below 45 mm are punched and for sizes 100-50 and 130-70 and KL 100 and 130 when angles below 65 mm leg lengths shall be punched.

Please ask for the detailed catalogue of MUBEA standard punches and dies.

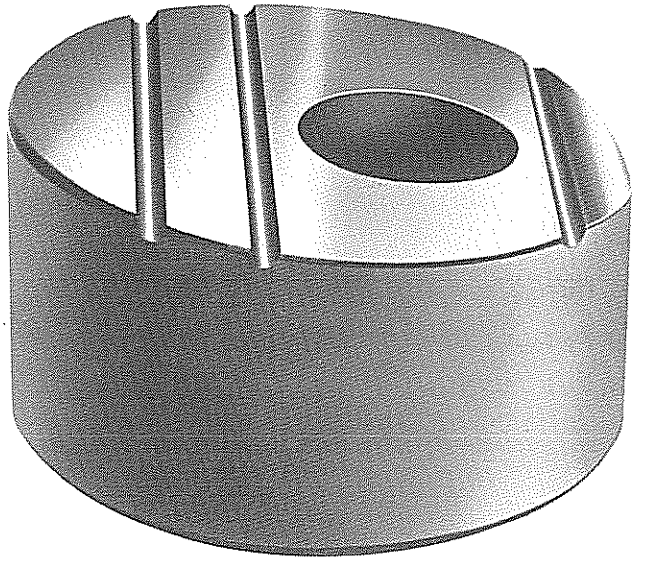


Fig. 88: Flange die for I-beams

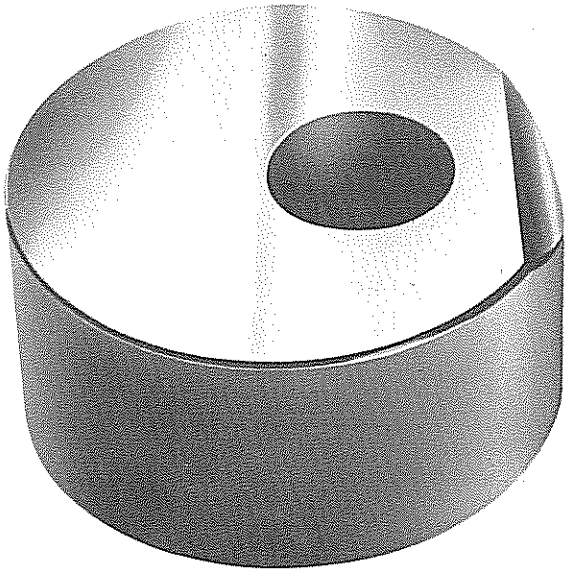


Fig. 89: Eccentric die for small angles

5. Adjusting the Punch and Die

Punch and die must always be arranged concentrically. The shearing gap should be about 5 % of the thickness of the material to be punched. (When punching a thickness of 10 mm ,the diameter of the die hole must be 1 mm larger than the punch diameter. The shearing gap is then 0,5 mm.) Please therefore always specify the thickness of the material when ordering.

After loosening the fixing screws 721 and the adjusting screws A 724, the saddle can be moved forward and backward. The adjusting screws A 723 serve for fixing the saddle laterally. When punch and die have been properly set, retighten the adjusting screws A 723, the set screws A 724 and the saddle securing screws 721.

Regularly check the position of the tools during punching by dipping the punch into the die by means of the pilot lever.

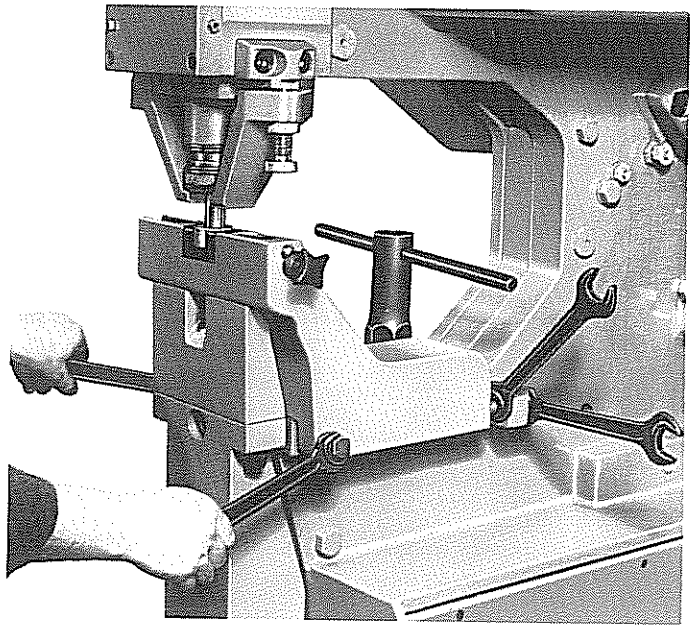


Fig. 90: Adjusting punch and die

If small holes are punched in thin material, a reducing insert A 851 which is secured with 2 countersunk screws A 852 is fitted to the stripper.

6. Anti-Twist Device for Shaped Punches

Square, rectangular or other shaped punches must be secured against twisting. For this purpose a slot is provided at the contact surface of the punch in each punch holder and on each standard punch on the head surface.

A wedge should be introduced into this groove.

7. The Stripper

The rugged stripper is adjustable for any thickness of material. Adjustment is made by means of handwheel 843 on the left-hand side of the machine and by means of the knurled screw A 849 with nut 850 on the right-hand side of the machine.

8. The Punch Centre Spotter

The punch centre spotter enables the slide to be moved downwards together with the ram by means of the spotter lever 590 and the punch can be applied with a point on a punch mark in the material.

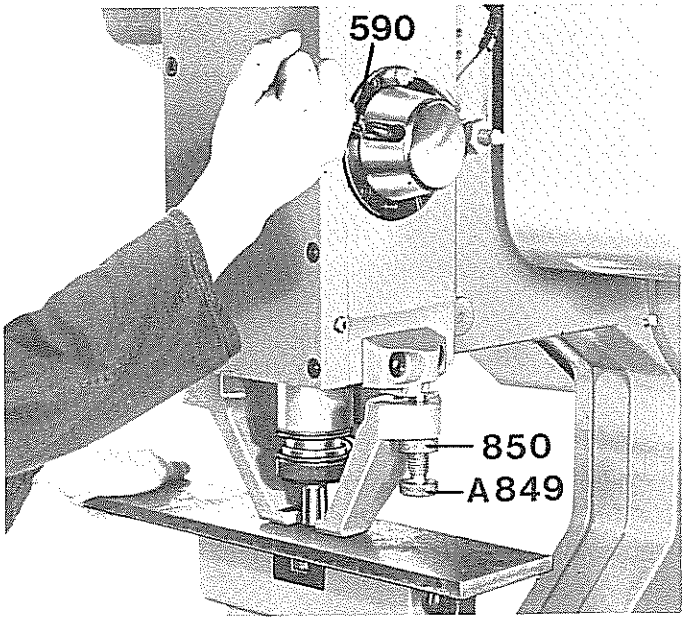


Fig. 91: Punch center spotter

When actuating the spotter, push the spotter lever 590 downwards first and then to the left in the direction of the punch housing until the spotter disc 585 has snapped into place. The punch slide A 370 is now separated from the control lever A 297 and when the spotter is guided upwards it glides through the effect of its weight onto the material or into the die.

The punch slide A 370 can be lifted by pressing the spotter lever 590 downwards. The centre mark in the material can now be aligned with the centre tip of the punch. When the spotter lever 590 is released it returns to its original position while the punch remains suspended above the material, thereby eliminating any faulty punching. In this position the punch is engaged for the working stroke.

After finishing the working stroke the punch slide has returned to the zero position.

9. Regrinding the punching tools

Regrind punching tools at their faces only to prevent a change in the clearance between punch and die. To extend service life of the tools regularly wipe the cutting edges with oil.

In many cases it is more convenient to order new tools. This is more economical in the long run, and the ground finish is perfect.

10. Quick-Change Device for Punches and Dies

The machine is equipped as standard with quick-change device for round punches and dies. In a matter of moments both parts of the tools can be changed quickly and reliably.

This equipment is particularly economical for working small batches which require frequent punch and die change.

Square rectangular or other shaped punches and dies can also be clamped with this facility, though the shearing gap has to be checked every time a change is made. Very frequently the saddle has to be aligned again. In addition to realignment, the lock nut securing feature, the clamping ring for the punch has to be retensioned after the first punching operation, since the centering pin does not enter the aligning groove until after the first punching operation has been performed.

When large batches are being delt with, it is recommended that the more robust method of fixing the punch by means of lock nut being employed, Conversion of the quick-change device for the lock nut is carried out by releasing the threaded pin "a" which releases the ball ring so that it can be screwed off. After this has been carried out, the punch is already prepared for securing with lock nuts. Fitting of the quick-change equipment is effected in the reverse sequence. If a punch cannot be properly clamped for some reasons, the basic position of the ball ring must be corrected. For this purpose the threaded pin "a" must be released and the ball ring adjusted slightly and then secured again by the threaded pin.

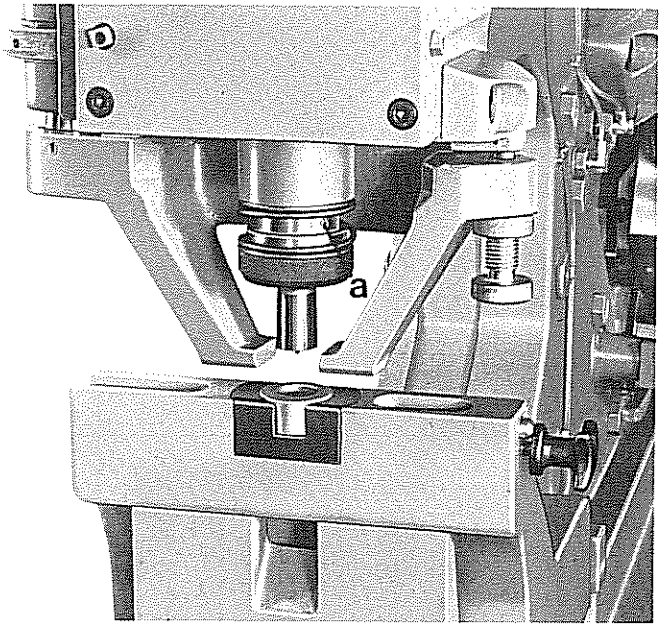


Fig. 92: Quick-change punching device for punches and dies

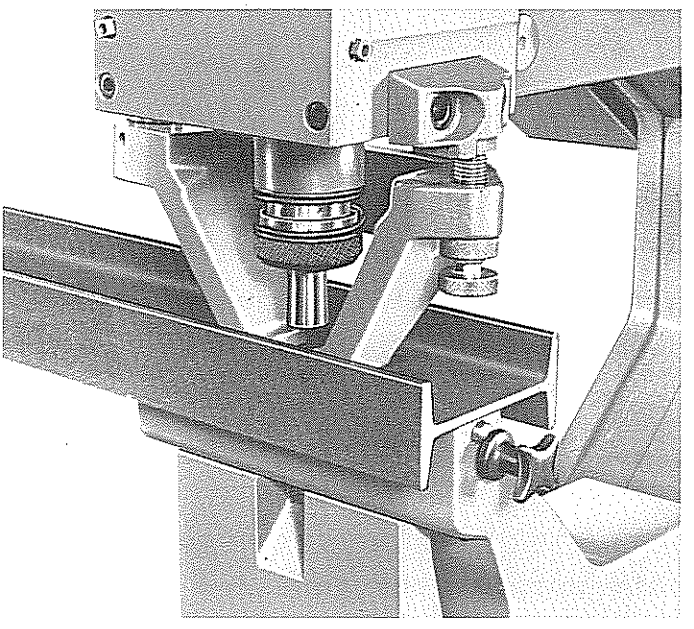


Fig. 93: Punching of I-beams in web

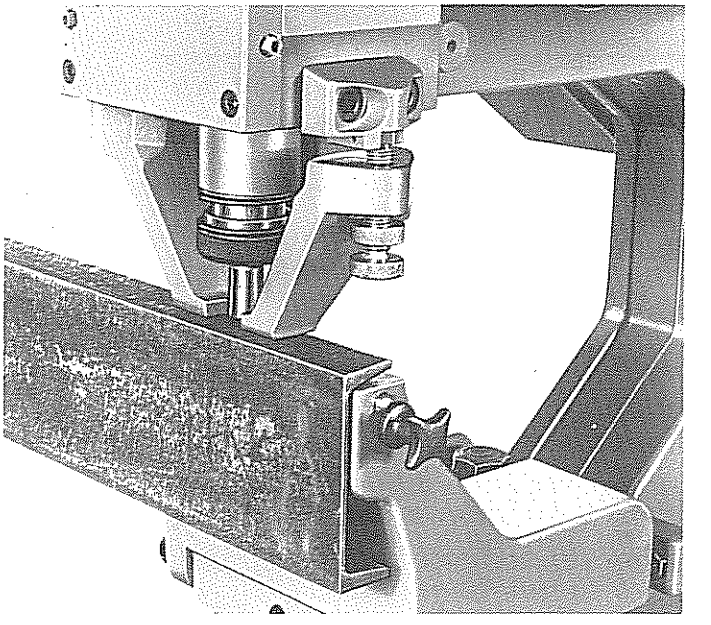
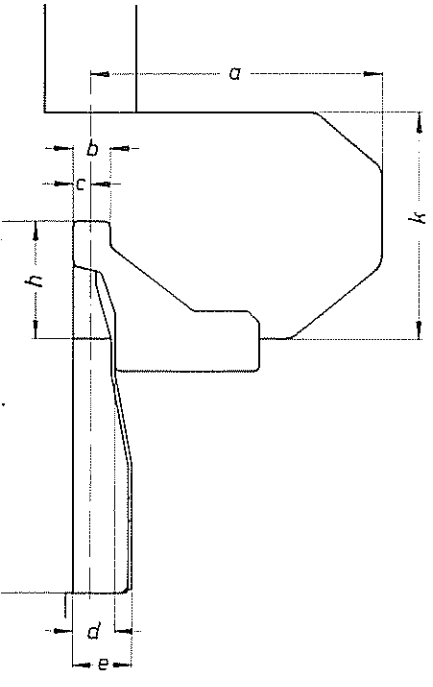
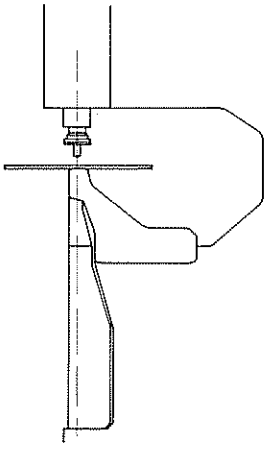
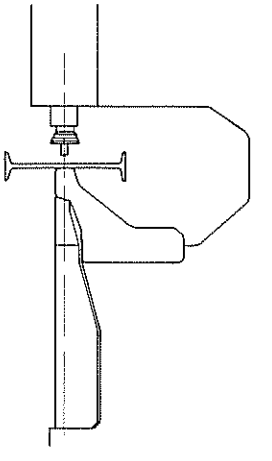


Fig. 94: Punching holes in the flange of channels

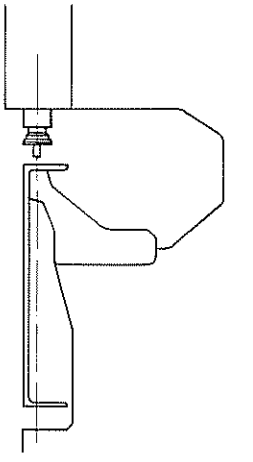




Flat, angel and tee material is being punched with saddle support always.



Channels and beams in the web are being punched with saddle support always.



Channels and beams are being punched in the flange without saddle support.

KBL OPTIMA KL OPTIMA	45-20 45		65-30 65		80-40 80		100-50 100		130-70 130	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
a	320	12 19/32"	402	15 53/64"	500	19 11/16"	500	19 11/16"	750	29 1/2"
b	47,5	1 7/8"	47,5	1 7/8"	47,5	1 7/8"	68	2 11/16"	68	2 11/16"
c	22,5	57/64"	22,5	57/64"	22,5	57/64"	30	1 3/16"	30	1 3/16"
d	55,5	2 3/16"	57,5	2 17/64"	62,5	2 15/32"	70	2 3/4"	70	2 3/4"
e	74,5	2 15/16"	82,5	3 1/4"	117	4 39/64"	142	5 19/32"	142	5 19/32"
f	535	21 1/16"	673	26 1/2"	707	27 27/32"	780	30 23/32"	910	35 13/16"
h	130	5 7/64"	178	7"	205	8 5/64"	210	8 17/64"	210	8 17/64"
k	240	9 29/64"	322	12 43/64"	375	14 49/64"	410	16 1/8"	410	16 1/8"

Fig. 95: Punch saddle dimension Models KBL and KL

11. Special Tools

The large MUBEA program of standard tools makes available all the common special tools at short notice. The special feature of the MUBEA punch design further offer a wide variety of possibilities for employing special tools, though these cannot be described briefly. The illustrated MUBEA literature gives a better review of this area.

a) Stationary Triple-Gang Punch

For punching single holes of various diameter in a quickly alternating sequence it is advisable to use a triple gang punch. This tool punches holes with 3 different diameters in one pass without a tool change. The desired punch is moved into the working position by pulling a slide.

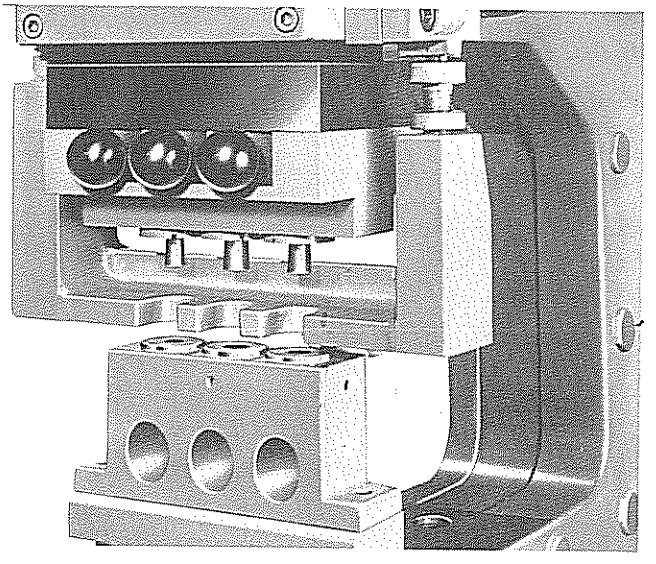


Fig. 96: Stationary triple-gang punching tool

b) Adjustable Two-Gang Punch

This tool permits simultaneous punching of 2 holes with the same or different diameters at different spacings. The required spacing is set on a scale which can be read off easily, and this is done simultaneously for punch and dies so that when the setting has once been made no more adjustment is necessary.

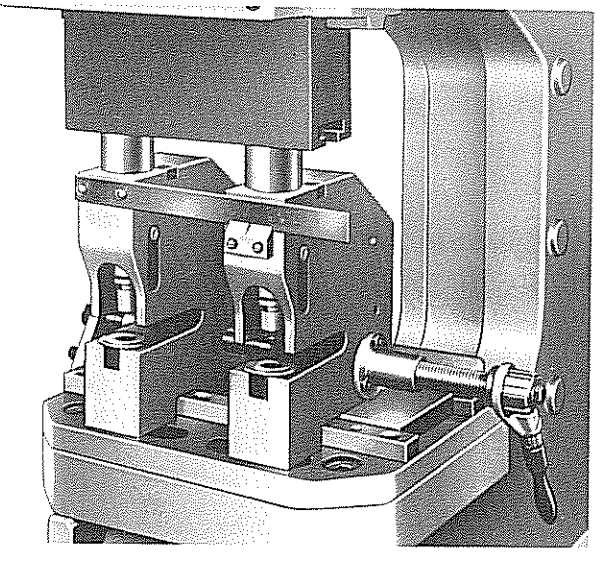


Fig. 97: Adjustable double-gang punching tool

c) Special Punching Equipment for Accomodating Punches and Dies with a Cutting Diameter of up to 50 mm

All punching tools, i.e. round, square, rectangular and elongated hole tools which are within the following cutting ranges can be accommodated in this equipment:

Models KBL 45-20, 65-30, 80-40 and KL 45, 65, 80 from 30,5 to 50 mm Ø

Models KBL 100-50, 130-70 and KL 100, 130 from 40,5 to 50 mm Ø

The complete equipment consists of: punch holder M 64, lock nut M 64 with a through hole of 50 mm, insert with through hole of 40 mm, stripper, saddle with 80 mm seat, die holder 80/60 and saddle support.

The punches are clamped with a lock nut. The shaped punches should always be provided with a cross groove so that the tools can be fitted longitudinallly and laterally. When ordering the tools the thickness of the material to be punched and the mechanical properties should be stated.

d) Special Punching Equipment for Accomodating Punches and Dies Exceeding 50.5 mm Diameter

All punch tools, i.e. round, square, rectangular and elongated hole tools, which are included in the following cutting ranges can be accommodated in this device, consisting of punch holder, pick-off, saddle insert, saddle and saddle support:

Models KBL 45-20 and KL 45
50,5 to 100 mm Ø
Models KBL 65-30 and KL 65
50,5 to 150 mm Ø
Models KBL 80-40 and KL 80
50,5 to 150 mm Ø
Models KBL 100-50 and KL 100
50,5 to 150 mm Ø
Models KBL 130-70 and KL 130
50,5 to 150 mm Ø

In the case of shaped punches (elongated hole and rectangle) the order should state whether the tools are to be employed longitudinally or laterally in the machine In addition the thickness of the material to be punched and the mechanical properties should be given. The punches are fixed with a wedge.

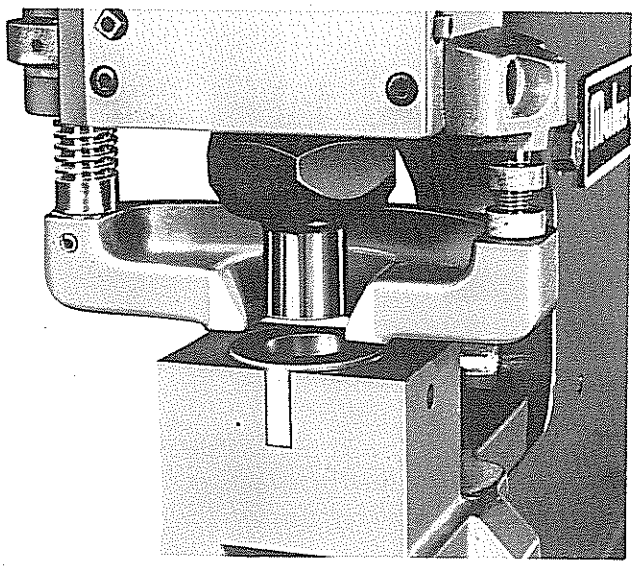


Fig. 98: Special punching equipment for accommodating punches and dies with diameters of up to 50 mm

e) Pipe Notching Tool

Pipe notching tools serve for notching pipe or tube in such a way that they can be welded together squarely without additional finishing. This equipment can notch tubes up to 60 mm outer diameter at a max. material thickness of 6 mm. For different tube diameters there are needed only the two cutting inserts for the moveable and the stationary blade. When submitting inquiries, please furnish the following information:

a) Pipe dimension to be notched
b) Outer diameter of the pipe to which the notch is to be fitted
c) Material of the pipe to be notched.

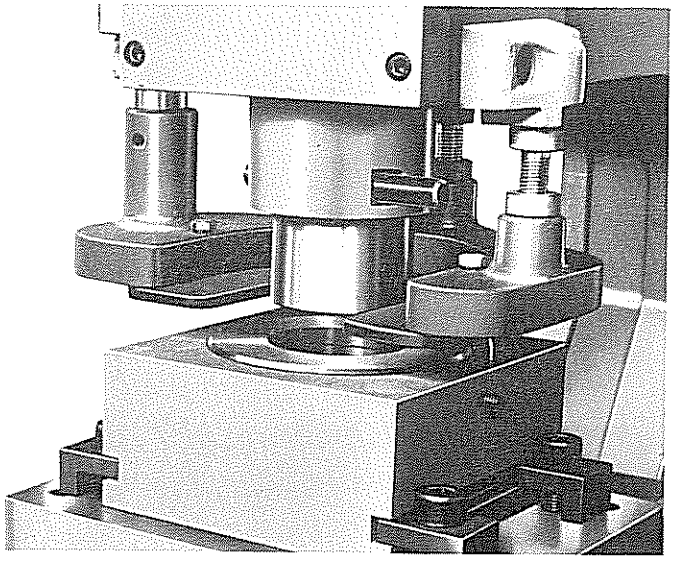


Fig. 99: Special punching equipment for accommodating punches and dies with diameters exceeding 50,5 mm

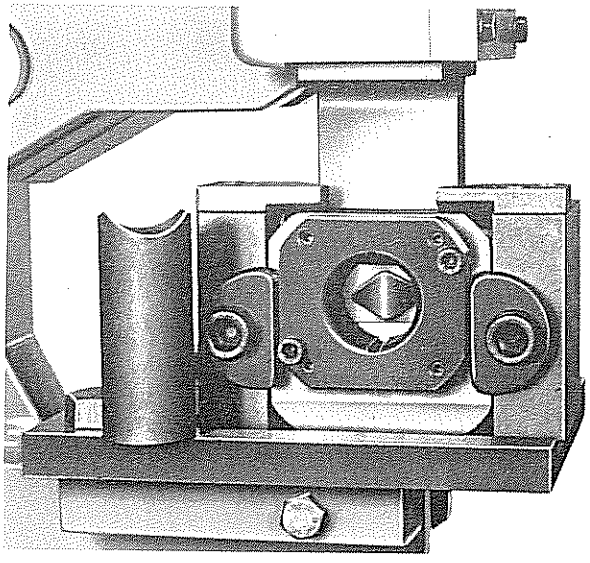
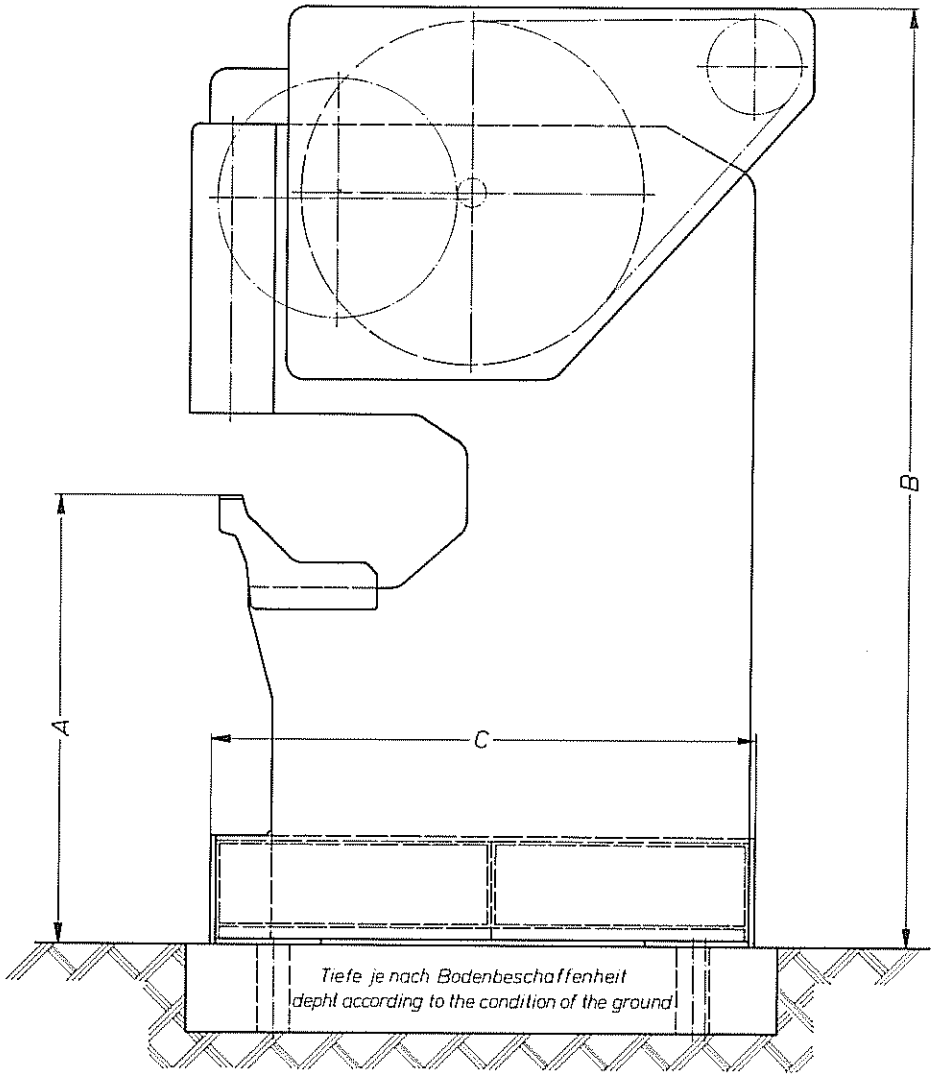
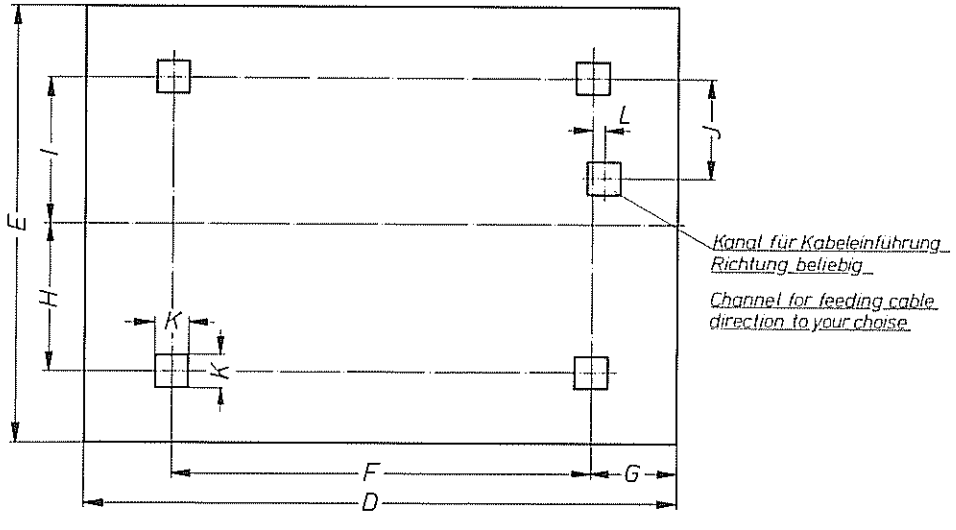
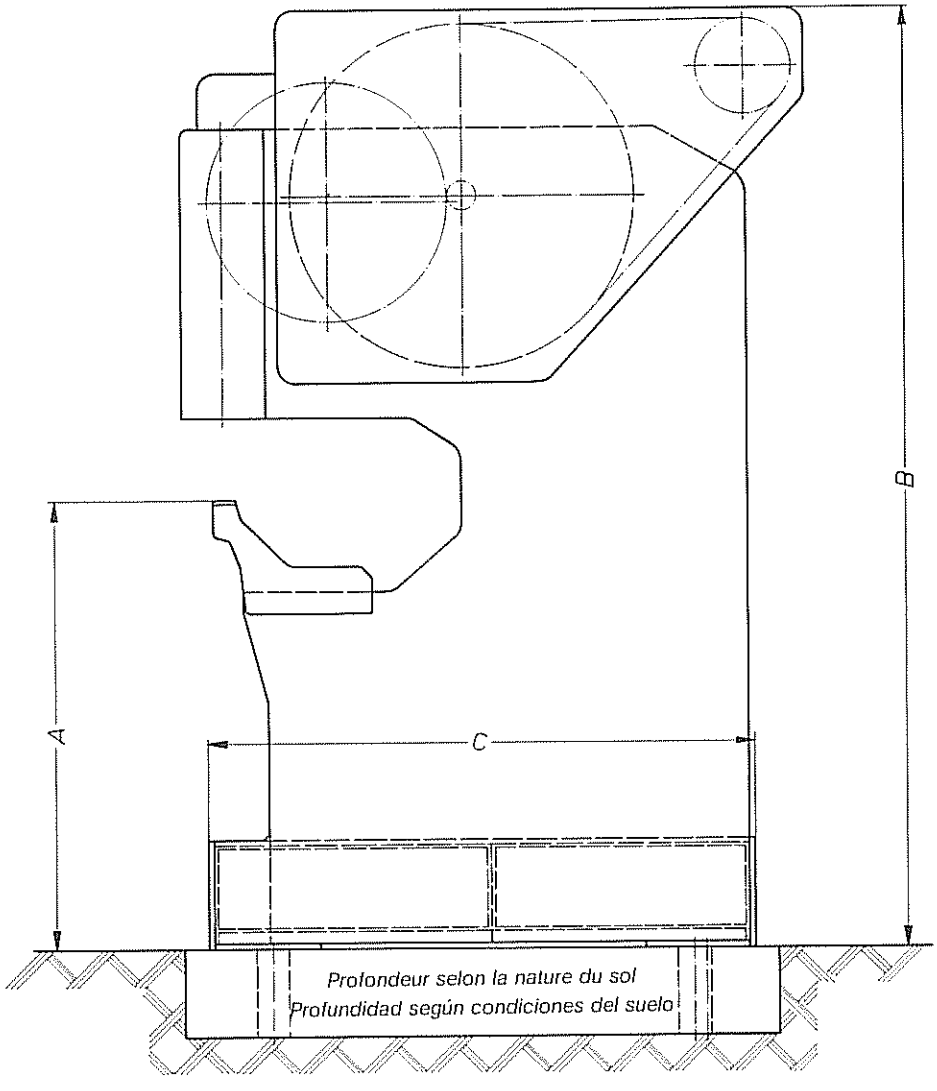


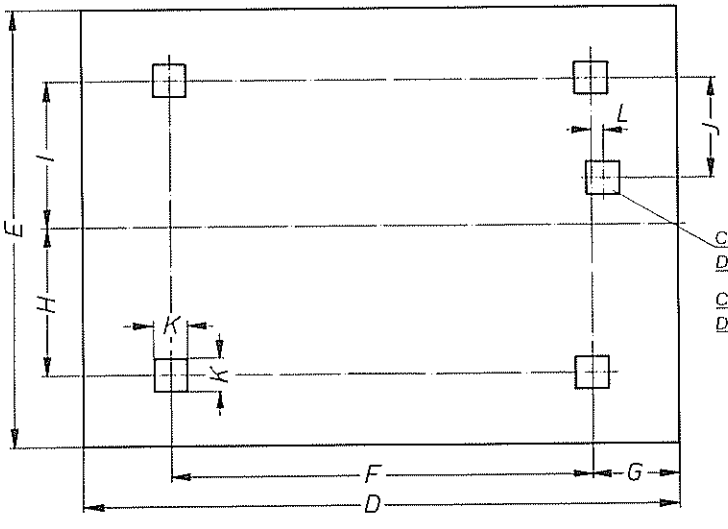
Fig. 100: Pipe notching tool



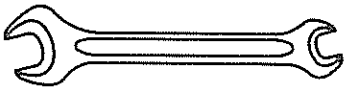


KL Optima		A	B	C	D	E	F	G	H	I	J	K	L
45	mm	915	1614	841	950	700	675	137,5	250	250	160	70	25
50	inch	36 1/32	63 35/64	33 7/64	37 13/32	27 9/16	26 37/64	5 13/32	9 27/32	9 27/32	6 19/64	2 3/4	63/64
65	mm	928	1840	1014	1114	845	740	187	297,5	297,5	220	70	50
71	inch	36 17/32	72 15/32	39 59/64	43 55/64	33 17/64	29 9/64	7 23/64	11 23/32	11 23/32	8 21/32	2 3/4	1 31/32
80	mm	940	1955	1150	1250	920	880	185	310	310	210	70	25
88	inch	37	76 63/64	45 9/32	49 13/64	36 7/32	34 41/64	7 9/32	12 13/64	12 13/64	8 17/64	2 2/4	63/64
100	mm	995	2112	1197	1300	980	798	182	340	340	315	70	80
110	inch	39 11/64	83 5/32	47 5/32	51 11/64	38 37/64	31 27/64	7 11/64	13 25/64	13 25/64	12 13/32	2 3/4	3 5/32
130	mm	1118	2470	1700	1800	1100	1238	215	375	375	350	70	100
143	inch	44 3/64	97 9/32	66 15/16	70 55/64	43 5/16	48 3/4	8 15/32	14 49/64	14 49/64	13 25/32	2 3/4	3 15/16





KL Optima		A	B	C	D	E	F	G	H	I	J	K	L
45	mm	915	1614	841	950	700	675	137,5	250	250	160	70	25
50	inch	36 1/32	63 35/64	33 7/64	37 13/32	27 9/16	26 37/64	5 13/32	9 27/32	9 27/32	6 19/64	2 3/4	63/64
65	mm	928	1840	1014	1114	845	740	187	297,5	297,5	220	70	50
71	inch	36 17/32	72 15/32	39 59/64	43 55/64	33 17/64	29 9/64	7 23/64	11 23/32	11 23/32	8 21/32	2 3/4	1 31/32
80	mm	940	1955	1150	1250	920	880	185	310	310	210	70	25
88	inch	37	76 63/64	45 9/32	49 13/64	36 7/32	34 41/64	7 9/32	12 13/64	12 13/64	8 17/64	2 2/4	63/64
100	mm	995	2112	1197	1300	980	798	182	340	340	315	70	80
110	inch	39 11/64	83 5/32	47 5/32	51 11/64	38 37/64	31 27/64	7 11/64	13 25/64	13 25/64	12 13/32	2 3/4	3 5/32
130	mm	1118	2470	1700	1800	1100	1238	215	375	375	350	70	100
143	inch	44 3/64	97 9/32	66 15/16	70 55/64	43 5/16	48 3/4	8 15/32	14 49/64	14 49/64	13 25/32	2 3/4	3 15/16

Zubehörwerkzeuge Accessories		KBL Größe - Size					KL Größe-Size					KF Größe-Size			KFS Größe-Size		
Größe Size	Bestell-Nr. Order-No. MBN...	45-20	65-30	80-40	100-50	130-70	45	65	80	100	130	40	50	70	40	50	70
																	
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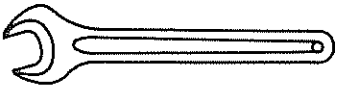
17×19	24 033	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24×30	24 035	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36×41	24 036																
																	
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13	24 021																
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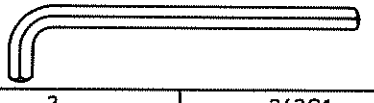
41	24013																
46	24014					X											
60	24017	X	X	X			X	X	X								
75	24019				X	X				X	X						
																	
36 80 lang	24 206		X	X	X												
46 150 lang	24 208	X	X	X	X	X	X	X	X	X	X						
																	
A 14	24 293	X	X	X	X	X	X	X	X	X	X						
																	
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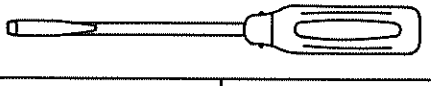
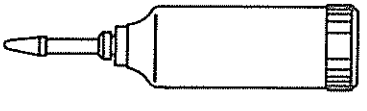
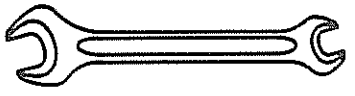
8	24305	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	24306	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	24307		X	X	X	X			X	X	X		X	X			
14	24 308	X	X	X	X	X			X	X	X						
17	24 309	X	X	X	X	X	X	X	X	X	X	X	X				
19	24310			X	X	X						X	X				
22	24311					X								X			
																	
-	24 501	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fühlerlehre Thickness gauge																	
15 x 0,3 x 140	24701	X	X	X	X	X						X	X	X	X	X	X
																	
Nr. 2	22 106	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Putzlappen Rag for cleaning																	
-	24 651	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Outils d'accessoires Herramientas de accesorios		KBL Type – Tipo					KL Type – Tipo					KF Type – Tipo			KFS Type – Tipo		
Type Tipo	Numéro de commande Número de pedido MBN...	45-20	65-30	80-40	100-50	130-70	45	65	80	100	130	40	50	70	40	50	70
																	
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17×19	24 033	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24×30	24 035	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36×41	24 036																
																	
11	24 004																
13	24 021																
36	24 012		X	X	X	X				X	X		X	X	X	X	X
41	24013																
46	24014					X											
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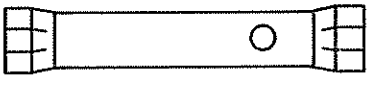																	
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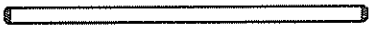
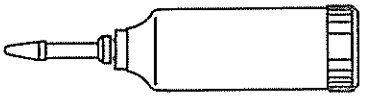
																	
A 14	24 293	X	X	X	X	X	X	X	X	X	X						
																	
3	24301	X	X	X	X	X	X	X	X	X	X						
5	24303	X	X	X	X	X	X	X	X	X	X						
6	24304	X															
8	24305	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	24306	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	24307		X	X	X	X			X	X	X		X	X			
14	24 308	X	X	X	X	X			X	X	X						
17	24 309	X	X	X	X	X	X	X	X	X	X	X	X				
19	24310			X	X	X						X	X				
22	24311					X								X			
																	
-	24 501	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jauge d'épaisseur Calibre de espesores																	
15 × 0,3 × 140	24 701	X	X	X	X	X						X	X	X	X	X	X
																	
No. 2. Núm. 2	22 106	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chiffon à nettoyer Trapo de limpieza																	
-	24 651	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X